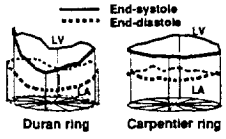
three-dimensional (3-D) analysis of mitral annular configuration and dynamics in patients with an annuloplasty ring has not been reported. Introduction of multiplane transesophageal echocardiography (M-TEE) provides 3-D reconstruction of the mitral annulus from multiple cross-sectional views from a stable transducer position by rotating around a central axis. Therefore, we evaluated the effect of the annuloplasty ring on mitral annular configuration and dynamics by using M-TEE 3-D reconstruction. Six patients with a flexible Duran ring and 6 with a rigid Carpentier ring who underwent mitral valve repair for mitral regurgitation were examined by M-TEE.

Results; In patients with a flexible Duran ring, the annulus had a nonplanar configuration and the annular area changed during the cardiac cycle. The percentage reduction in the annular area in these patients was 24 ± 5%. In patients with a rigid Carpentier ring, however, the annulus had planar configuration and the annular area did not change during the cardiac cycle.

Conclusion; 3-D reconstruction of the mitral annulus by M-TEE revealed that mitral annular configuration and dynamics are physiological in patients with a flexible Duran ring compared with a rigid Carpentier ring.



922-58 Comparison of the Mitral Annulus in Normals and Patients with Cardiomyopathy by Dynamic Three-dimensional Reconstruction from Transesophageal Echocardiograms

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To compare shape and dynamic behavior of the mitral annulus (MA) in normals (N) and patients (pts) with cardiomyopathy, multiplane transesophageal echos (MTEE) from seven pts with hypertrophic obstructive (HOCM) and five with dilative cardiomyopathy (DCM) were compared to 10 N. *Methods;* The mitral valve was imaged from a stable transducer position in 12 planes 15° apart each; MA points were identified in each frame of one cardiac cycle and reconstructed in space and time. Shape, apico-basal translation (AB), minimal area and cyclic area change (ΔA) were analyzed using a least squares plane fitted to MA for each frame. *Results;* Significant differences were detected between the three groups. Mean AB was higher in N and HOCM than in DCM (11, 8, and 4 mm, respectively; $p < 0.02$); minimal areas were lower in HOCM than in DCM or N ($p < 0.05$), while mean ΔA was higher in HOCM than in N and DCM ($p < 0.05$).

Conclusion; dynamic three-dimensional reconstruction of MTEE images allows detailed *quantitative* analysis of MA shape and behavior in normals, HOCM and DCM.

922-59 Aortic Inner Surface Morphology in Aortic Disease by Three-Dimensional Transesophageal Echocardiography: Its Advantages and Limitations for Diagnosis

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The purpose of this study was to evaluate the inner surface morphology of the aorta in different pathologies using three-dimensional transesophageal echocardiography (3D-TEE), and to clarify its feasibility and limitations for clinical application. Two-dimensional TEE was performed in 20 patients with aortic disease (12 aortic dissection, 4 aortic aneurysm, 4 aortic sclerosis) and 7 with normal aorta. Transverse view of the descending aorta was taken at each 2 mm interval by manually withdrawing the probe. Each image was recorded in VTR during one beat. Off-line data analysis was performed and 3D image was reconstructed using Lambert shading method. In 8 cases with DeBakey type III aortic dissection who had the entry or reentry and flow in the false lumen, 3D-TEE could demonstrate the irregularity on the shape of intimal tear and the wavy movement of flap, and clarify the accurate location of the intimal tear and the transverse and longitudinal extent of the dissecting flap in all cases. These coincided with the operating findings in 3 cases underwent surgical treatment. On the other hand, the image of inner surface area in 4 cases that the false lumen was filled with thrombus, could not be differentiated from a normal aorta. In cases with aortic aneurysm or atherosclerosis it was possible to visualize the spatial morphology of the aneurysm or plaque and determine its extension. However, nature of the plaque (soft or hard) and intramural thrombus (fresh or old), could not be estimated by the image of inner surface reconstruction. In conclusion, these results suggest that 3D-TEE has advantages in estimation of the surface morphology, spatial extent and actual location of aortic abnormalities and limitations in tissue characterization.

922-60 How Positionally Stable is a Transesophageal Echo Probe During 3 Dimensional Imaging? Implications for 3 Dimensional Reconstruction

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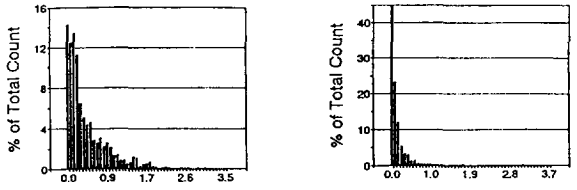
Three dimensional (3D) reconstruction from a single esophageal scanning position requires a stable relationship between the probe and the heart. The purpose of this study was to examine the movement of a transesophageal echo (TEE) probe during 3D image acquisition. A new dual axis multiplane probe was used which includes a miniature (6 × 6 × 9 mm) 6D sensor in the tip. The sensor identifies the probe's 3D position and orientation in space with respect to the location of a magnetic field generator placed beneath the subject. In vivo 3D scans were performed in 5 anesthetized, ventilated dogs. Positional determinations were acquired every 66 ms. The sensor axes were: x-mediolateral, y-superoinferior, z-anteroposterior, and r-radial distance $= \sqrt{(x^2 + y^2 + z^2)}$. The movement was estimated by computing standard deviations of the x, y, and z positions during each 3D scan and each cardiac cycle. From 2337 determinations, the mean standard deviation for 10 3D scans and 264 cardiac cycles and histograms of the radial movement were calculated and are shown.

	x (mm)	y (mm)	z (mm)	r (mm)
Total 3D scans	0.63 ± 0.63	0.56 ± 0.64	0.65 ± 0.45	0.57 ± 0.43
Cardiac cycle	0.28 ± 0.36	0.21 ± 0.28	0.25 ± 0.35	0.24 ± 0.35



Conclusion; Probe movement during 3D imaging is measurable and in these anesthetized subjects was within acceptable limits. This capability will be useful in awake patients where greater movement is expected, and will optimize the 3D data set by discarding scans where significant probe movement has occurred.

923 Myocardial Injury and Function Following Myocardial Infarction

Monday, March 20, 1995, 3:00 p.m.–5:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: 3:00 p.m.–4:00 p.m.

923-1 Inhibition of Neutrophil Function by Lidocaine as a Mechanism for the Beneficial Effect to Reduce Myocardial Reperfusion Injury

João V. Vitola, John P. Holsinger, James Atkinson, Mervyn B. Forman, John J. Murray. *Vanderbilt University, Nashville, TN*

We have recently shown that lidocaine (lido) significantly reduces infarct size in the rabbit model of Myocardial Reperfusion Injury (MRI). In that study rabbits (n = 22) underwent 30 mins of circumflex occlusion and 48 hrs of reperfusion and where randomized in a blinded fashion to receive lido (n = 11, 4 boluses of 10 mg/kg in the first 10 mins of ischemia) or saline (n = 11). Lido reduced infarct size by approximately 50% ($p < 0.01$) of the area at risk. The present study further examines possible mechanisms for this beneficial effect. We studied the reperfused myocardium of both groups in a blinded fashion for histologic changes including the degree of neutrophil infiltration (PMN), hemorrhage (Hemo) and contraction bands (Band). Associated with the reduction on infarct size, lido inhibited the PMN infiltration and hemorrhage in these hearts. We next examined the effects of lido ex vivo on PMN activation by chemiluminescence in whole blood. A significant reduction in the chemiluminescence response to the chemoattractant FMLP was obtained with rabbit and human blood. Chemiluminescence results expressed as percent inhibition of FMLP response. Mean ± SEM: